

Burrowing Owl Monitoring Report for Calendar Year 2012



Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy
under Contract DE-AC06-09RL14728



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1.0 Introduction

The burrowing owl (*Athene cunicularia*) is classified as a Washington Department of Fish and Wildlife Candidate Species. Burrowing owls are also protected under the Migratory Bird Treaty Act (MBTA). Conway et al. (2006) suggested that the reason for the population decline in Washington may be the reduction in numbers of ground squirrels, yellow-bellied marmots, and badgers, but loss of habitat to the intensification of agriculture and development has also affected the species. Most individuals that nest on the Hanford Site migrate and spend winter in areas much further south. Because the owls migrate to and nest on the Hanford Site and the Hanford Reach National Monument, the burrowing owl populations and the locations of burrows are of concern locally to the U. S. Department of Energy (DOE) and the U.S. Fish and Wildlife Service (USFWS).

Burrowing owls hunt all day and all night with peak activity levels in the morning and evening. The owls capture insects such as grasshoppers and beetles during the day and small mammals such as mice at night (Haug 1993). Burrowing owls collect dung of other animals and surround a burrow with the excrement in hopes of luring insects such as beetles that the owls capture and eat (Levy 2004).

Typical burrowing owl habitat includes deserts, grasslands, prairies, other natural areas, agricultural lands and man-altered environments. Although burrowing owls are thought to prefer habitat that has not been modified by man, they are found in proximity to humans at golf courses, airports and in suburban areas (Coulombe 1971) (Figure 1). Unlike other owl species, the burrowing owl nests underground rather than in trees or other above-ground structures. The owls typically use abandoned burrows created by badgers, coyotes, and ground squirrels. It is believed burrowing owls are capable of digging their own burrows, but often prefer those left by other animals (Haug 1993). Burrowing owls prefer open, short grass habitat with suitable perches near the burrow to survey for both predators and prey.

Monitoring burrowing owl populations contributes to the management and protection of the species, the maintenance of site-wide biological diversity and resource management, and assists with proper impact assessment of Hanford Site projects. Many Hanford Site projects include impacts to the ground surface with activities such as; grubbing, excavating, burning, off-road driving, compacting, and leveling. Without good documentation of current owl burrow locations it can be difficult to provide guidance on their protection. Continued monitoring and protection of this state candidate species will help to assure the continued presence of burrowing owls on the Hanford Site.



Figure 1. Burrowing Owl using Fence Post near Roadway as Perch on the Hanford Site

2.0 Methods

Historical burrow locations were visited to determine the current status of burrowing owls on the Hanford Site. Burrows were visited during the common residency window for burrowing owls (February-September). To avoid interfering with breeding of the owl populations, the surveys were performed in the month of May. At this point in the season most of the owlets have hatched, but have not matured enough to resemble adults. Later in the season the young may temporarily occupy nearby burrows, which could result in an over-estimation of burrow occupation.

The last census of burrowing owl nesting sites on the Hanford Site occurred in 2010. In 2012, all 110 known burrows (active and inactive) on Department of Energy (DOE) managed lands (Figure 2) were visited and the current status of each was determined. Field team members walked to each burrow location using Global Positioning System (GPS) coordinates (Figure 3). While approaching the burrow, field members visually scanned the area, looking for signs of occupation. An owl that directly left the burrow being visited was watched during the short flight and the location of its landing was noted. The area where the flushed owl landed was examined to determine if additional burrows were in the vicinity of the one tracked by the GPS unit. Field team members determined if a burrow was active by looking for owls in the burrow, or the presence of castings, feces, feathers and footprints at the opening of the burrow (Figure 4). The burrow was labeled as a nest if the burrow was a high use centralized burrow or if owl young were seen at the location. Additional classes of burrow activity included inactive, unusable, satellite, and potential for future use. Brief scans of the surrounding area for additional burrows were

made at each location. All newly discovered burrows were documented with the GPS system and added to the Hanford Site burrow database.

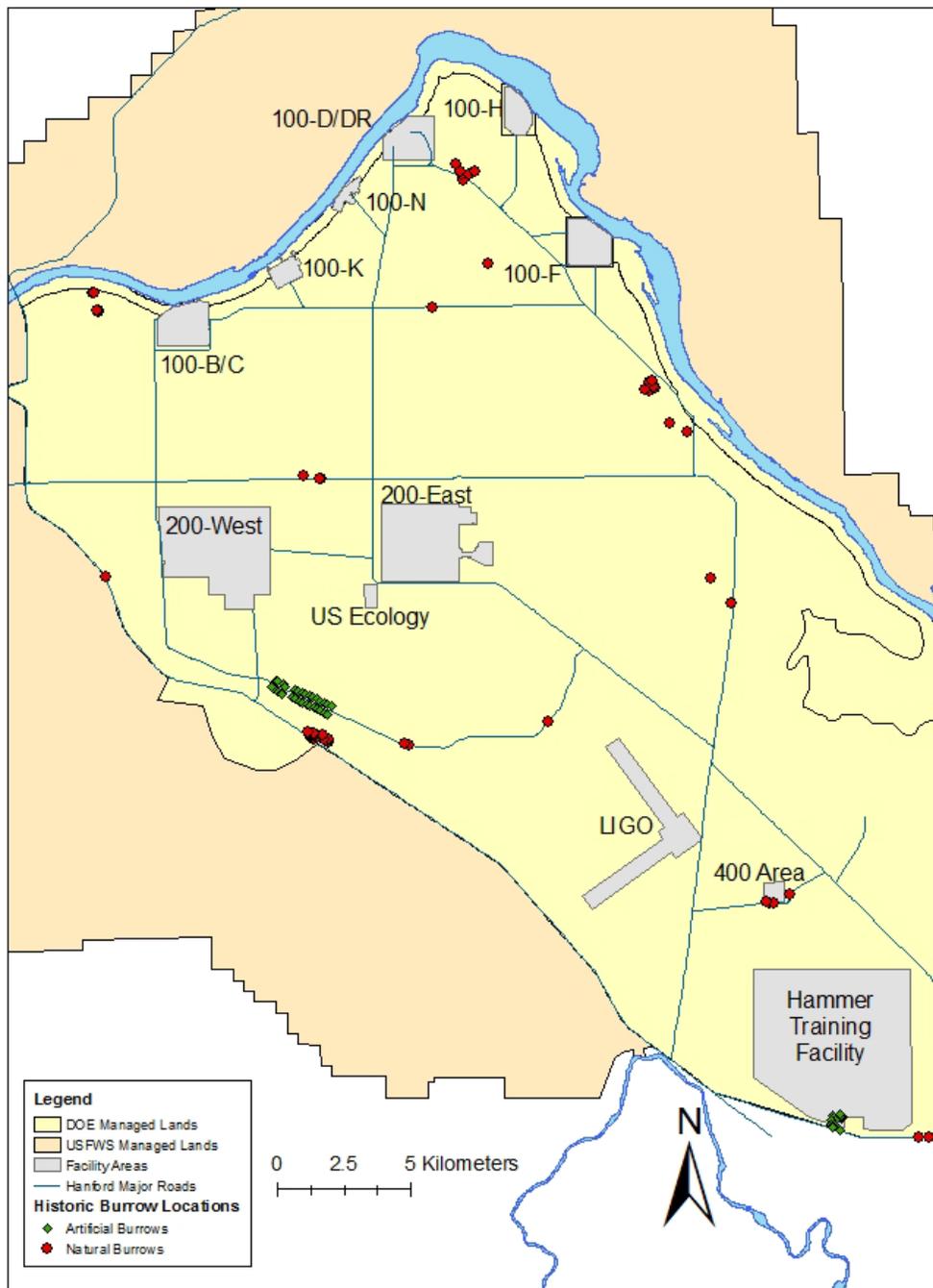


Figure 2. Historical Burrow Locations known prior to 2012 on DOE Managed Lands



Figure 3. Field Team Members Document the Status of an Artificial Burrow on the Hanford Site

In addition to all of the known natural burrows around the Hanford Site, field team members reviewed artificial burrows that various site contractors have installed as part of habitat mitigation actions. The same status categories used for the natural burrows were used for the artificial burrows with the addition of a category labeled as maintenance required. Maintenance required was assigned to artificial burrows in which the burrow opening was obstructed by soil or vegetation, preventing the use of the burrow.



Figure 4. Active Clay Pipe Burrow with many Survey Identifiers such as Feathers, Castings, and Footprints

3.0 Results

Field staff evaluated 110 historical burrows over seven surveys during May, 2012. Field staff located all the historical burrows and documented the current status of each (See Appendix). For the purpose of this report the term “natural burrow” is defined as a location at which the original use or intent of space was not burrowing owl habitat. Thus a “natural burrow” could be a hole excavated by a fossorial mammal or a man-made object such as a pipe or culvert that was discovered and occupied by owls. “Artificial burrows” are structures that were installed specifically for the purpose of attracting burrowing owls.

As of 2010, the historical database consisted of 58 natural burrows; the status of each of these was determined in May, 2012. Artificial burrows were not reviewed in 2010 so no comparisons can be made. In 2010, 22 natural burrows were designated as active. Of those 22 sites, 12 remained active in 2012, additionally, 4 natural burrows that were classed as inactive or unknown in 2010 became active in 2012. During the 2012 monitoring effort an additional 13 natural burrowing owl burrows were located (Figure 5), 7 of which were designated as active status bringing the total to 23 active natural burrows on the Hanford Site.

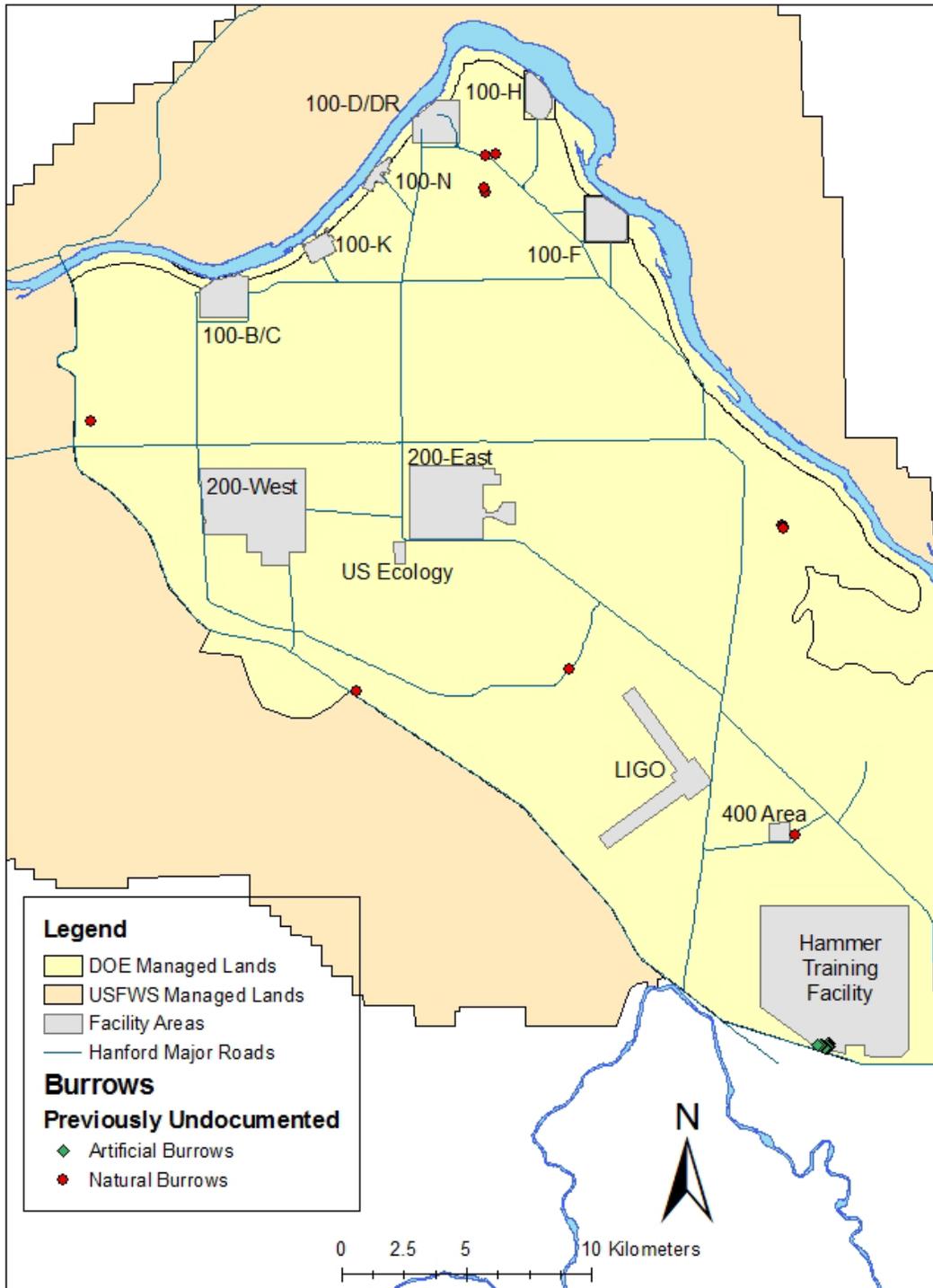


Figure 5. Previously undocumented burrow locations obtained during 2012 surveys

The 2012 monitoring effort also documented the current status of the 52 artificial burrows listed in the database. Field team members located an additional 13 artificial burrows which had not been included in the database bringing the total number of artificial burrows on the Hanford Site to 65. Monitoring was not performed in 2010 on the artificial burrows but it was found that 16 of the 65 artificial burrows were active in 2012. All of the active artificial burrows were either within the Emergency Vehicle Operations Course (EVOC) near HAMMER or in the area west of the EVOC. A total of 35 artificial burrows have been installed in this area. The 2012 monitoring effort revealed that upkeep of the artificial burrows has lapsed and of the 65 burrows, 29 required maintenance or were unusable in the current condition.

The total number of active natural burrows in 2012 (23) was very similar to the number of active natural burrows counted during 2010 (22). However, the 2012 total consisted of more man-made type structures such as pipes, culverts and other structures and fewer natural mammal digs or other soil based burrows compared to 2010 (Figure 6). The 23 active natural burrows and the 16 active artificial burrows give the Hanford site a total of 39 active burrows during the 2012 season (Figure 7).

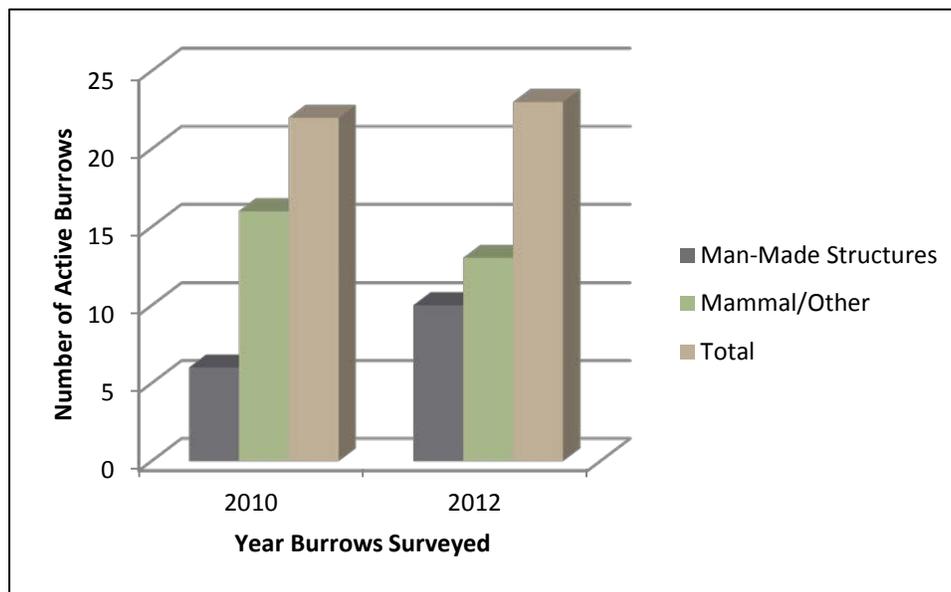


Figure 6 Comparing Quantity of Active Natural Burrows in 2010 to 2012

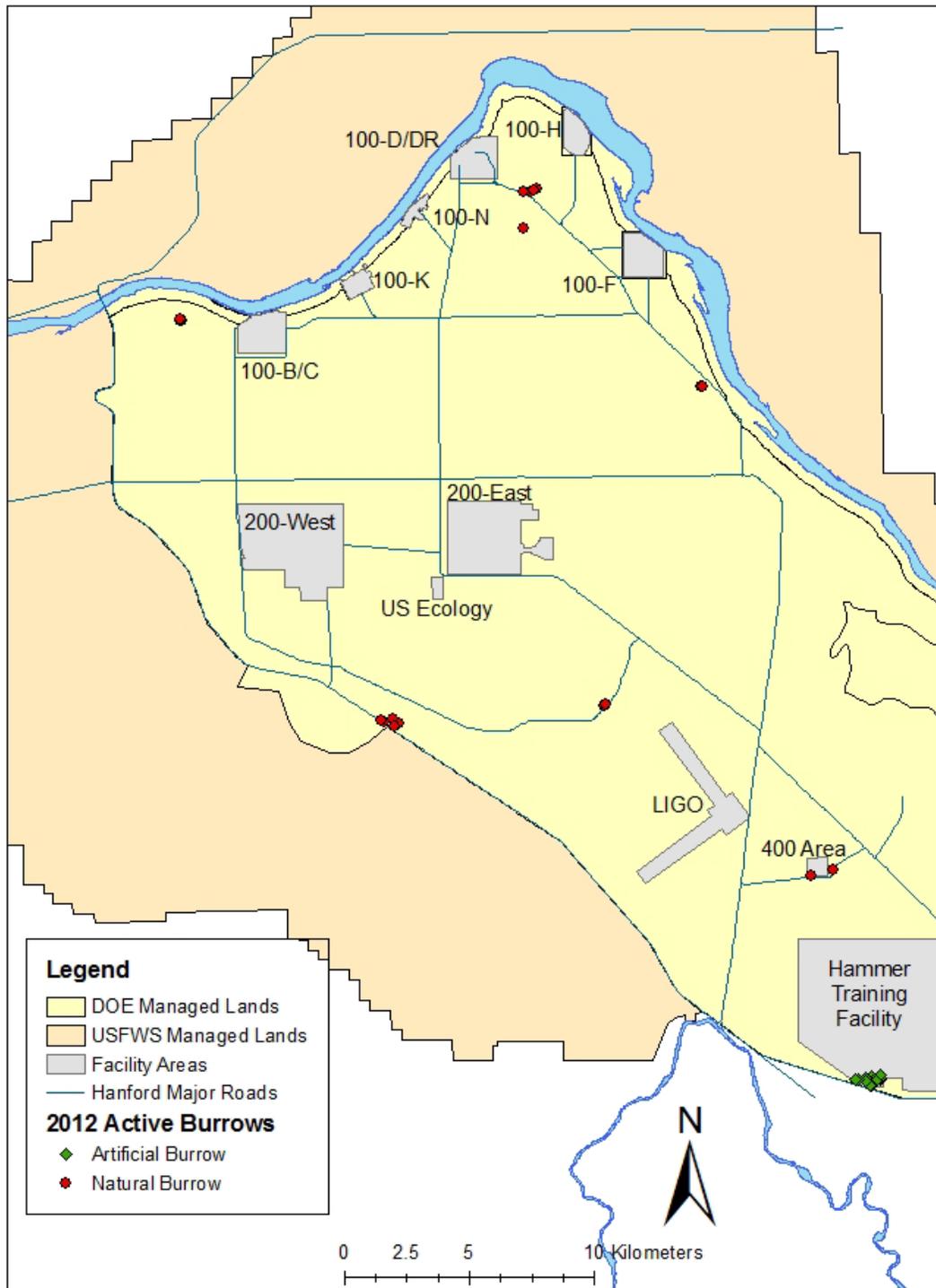


Figure 7. Active Burrows Documented during 2012 Survey

4.0 Discussion

The monitoring during 2012 focused on documenting the status of known burrows. Newly identified burrows were documented while examining historical locations, during ecological resource reviews, or discovered during other monitoring efforts. The timing of the monitoring effort allowed staff to perform the surveys without disrupting any breeding or hatching, while also allowing for easy discernment of adults from juveniles, which helped in determining burrow-use type.

The total number of active burrows in 2012 was very similar to the number in 2010, but a trend of an increase in the proportion of natural burrows occurring in man-made structures, as opposed to burrows of fossorial mammal holes, was observed. It is believed that most natural, soil-based burrows have on average a life span of 2.74 years (Bradbury 2010), which may explain why the number of active soil based burrows documented during 2010 went down by 2012. In order to avoid misrepresenting a reduction of burrowing owls by only documenting the status of previously identified burrows, future surveys will also focus on locating new burrows by performing surveys in larger areas around known nest sites. Continued work will help to establish long-term trends of burrowing owl numbers on the Hanford Site. Because these numbers are not available historically, it is not possible to determine how current levels compare to historical levels. Threats to burrowing owl populations include habitat loss and reduced populations of Townsend's ground squirrels (*Urocitellus townsendii*) and badgers (*Taxidea taxus*), that provide needed burrows. Monitoring of ground squirrel populations and protection of habitat areas surrounding burrowing owl burrows will assist with burrowing owl management.

Efforts in 2013 will limit focus on monitoring of all known burrow locations (Figure 8) to the 39 active burrows, the artificial burrows, and natural burrows that were listed as having a continued potential for use. The artificial burrows on the DOE managed lands will receive maintenance prior to the spring and potential owl use. A portion of the burrowing owl population in the area over winters ([Conway 2002](#)) so care to avoid disturbance of those owls will be taken. Radial perimeter surveys near known burrow locations will be performed in an attempt to locate new burrows on the site.

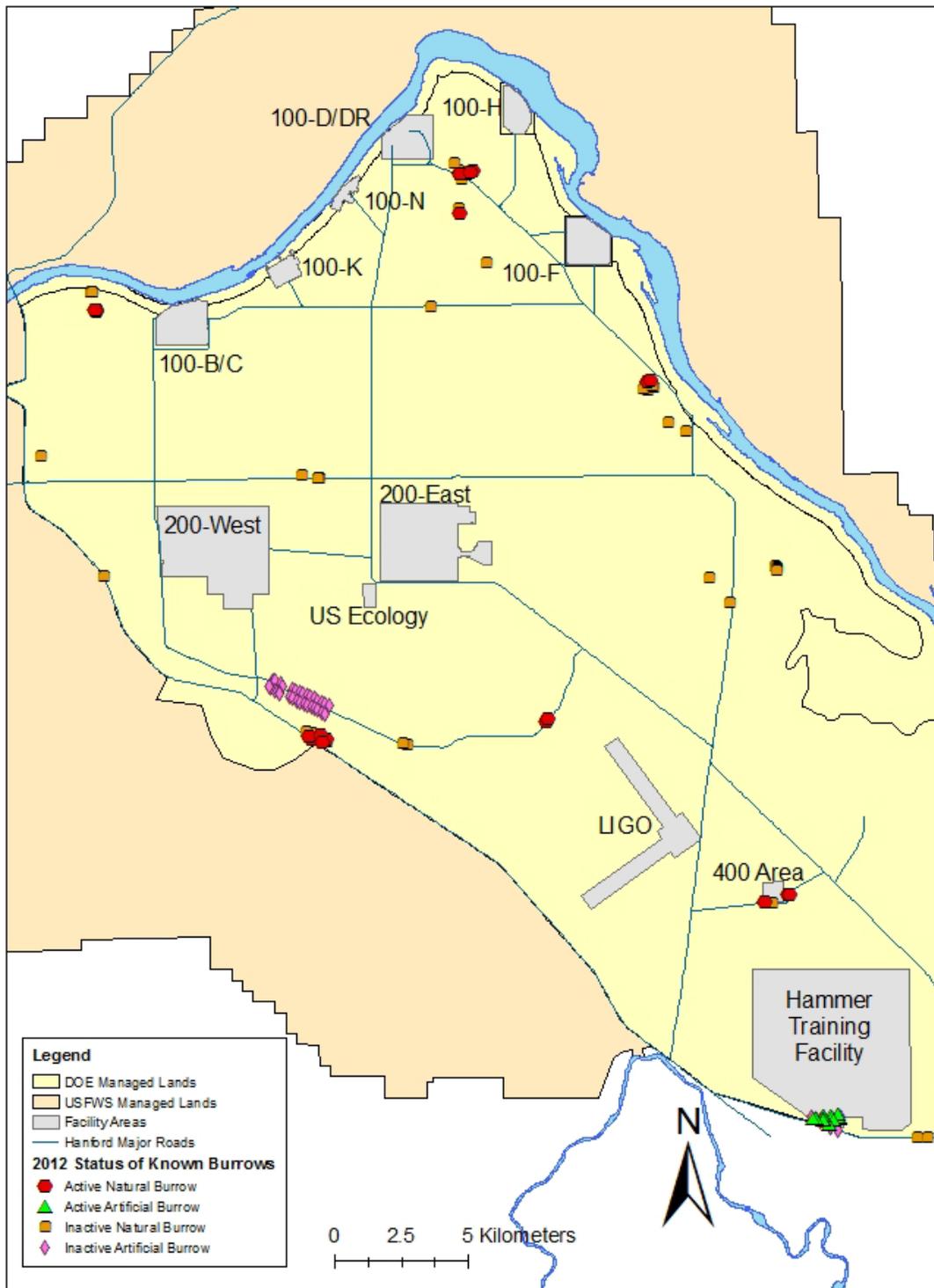


Figure 8. Current known extent of Burrowing owl burrow locations on DOE Managed Lands

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Appendix

Hanford Site Burrows Activity Status in 2010 and 2012

Hanford Site Burrows Activity Status in 2010 and 2012

Site Name	Burrow Construction	Use Type	STATUS 2010	STATUS 2012
100BC-1	MAN-MADE	NEST	active	Active
100BC-1A	MAN-MADE	SATELLITE	unk	Active
100BC-1B	MAN-MADE	SATELLITE	unk	inactive, potential
100BC-1C	MAN-MADE	SATELLITE	active	active
100BC-2A	MAN-MADE	UNK	inactive	inactive, potential
100BC-2B	MAN-MADE	SATELLITE	inactive	inactive, potential
100BC-3	MAN-MADE	NEST	inactive	inactive
100BC-3A	MAN/COYOTE	UNK	unk	inactive, unusable
100D-1	MAN-MADE	UNK	inactive	inactive, potential
AREVA-1	BADGER	NEST	inactive	inactive, unusable
AREVA-2	BADGER	NEST	inactive	inactive, unusable
Army Loop_WCH1	Artificial	UNK	n/a	inactive, potential
Army Loop_WCH10	Artificial	UNK	n/a	inactive, potential
Army Loop_WCH2	Artificial	UNK	n/a	inactive
Army Loop_WCH3	Artificial	UNK	n/a	inactive, potential
Army Loop_WCH4	Artificial	UNK	n/a	inactive, potential
Army Loop_WCH5	Artificial	UNK	n/a	inactive
Army Loop_WCH6	Artificial	UNK	n/a	inactive, potential
Army Loop_WCH7	Artificial	UNK	n/a	inactive, potential
Army Loop_WCH8	Artificial	UNK	n/a	inactive, potential
Army Loop_WCH9	Artificial	UNK	n/a	inactive, potential
ARMY-1	BADGER	NEST	inactive	inactive
ARMY-1A	BADGER	SATELLITE	inactive	inactive, unusable
ARMY-2	UNKNOWN	NEST	inactive	active
ARMY-2a	MAMMAL	UNK	n/a	Active
FFTF-1	BADGER	NEST	active	active
FFTF-1A	MAMMAL	SATELLITE	n/a	Active
FFTF-1B	MAMMAL	SATELLITE	n/a	active
FFTF-2	MAN-MADE	NEST	inactive	inactive, potential
FFTF-3	MAN-MADE	NEST	inactive	inactive, potential
FFTF-3A	BADGER	NEST	active	potentially active
GABL-1	MAN-MADE	NEST	inactive	Inactive, potential
H240-1	BADGER	NEST	active	inactive, destroyed
H240-1A	BADGER	SATELLITE	active	inactive, destroyed
H240-1B	BADGER	UNK	active	active
H240-1C	BADGER	SATELLITE	inactive	inactive, destroyed
H240-1D	BADGER	UNK	inactive	inactive
H240-2	BADGER	NEST	active	inactive, potential
H240-3	BADGER	UNK	active	inactive, potential
H240-3A	BADGER	UNK	active	inactive, potential

Site Name	Burrow Construction	Use Type	STATUS 2010	STATUS 2012
H240-4	BADGER	NEST	active	active
H240-4A	BADGER	NEST	active	active
H240-5	BADGER	NEST	active	inactive, potential
H240-5A	BADGER	SATELLITE	inactive	inactive, destroyed
H240-6	BADGER	SATELLITE	inactive	inactive, destroyed
H240-6A	BADGER	NEST	active	inactive, potential
H240-6B	BADGER	SATELLITE	active	inactive, potential
H240-6C	BADGER	SATELLITE	active	active
H240-7	BADGER	SATELLITE	active	potentially active
H240-8	UNKNOWN	UNK	active	inactive
H240-9	MAMMAL	UNK	n/a	Active
HAMMER_1	Artificial	UNK	n/a	active
HAMMER_10	Artificial	UNK	n/a	inactive, maintenance
HAMMER_11	Artificial	UNK	n/a	active, maintenance
HAMMER_12	Artificial	UNK	n/a	active
HAMMER_13	Artificial	UNK	n/a	inactive, maintenance
HAMMER_2	Artificial	UNK	n/a	active, maintenance
HAMMER_3	Artificial	UNK	n/a	inactive, maintenance
HAMMER_4	Artificial	UNK	n/a	inactive, unusable
HAMMER_5	Artificial	UNK	n/a	active, maintenance
HAMMER_6	Artificial	UNK	n/a	active, maintenance
HAMMER_7	Artificial	UNK	n/a	inactive, unusable
HAMMER_8	Artificial	UNK	n/a	inactive, maintenance
HAMMER_9	Artificial	UNK	n/a	inactive, maintenance
HAMMER_PNNL1	Artificial	UNK	n/a	inactive
HAMMER_PNNL10	Artificial	UNK	n/a	inactive, unusable
HAMMER_PNNL11A	Artificial	UNK	n/a	inactive, unusable
HAMMER_PNNL11B	Artificial	UNK	n/a	inactive, unusable
HAMMER_PNNL11C	Artificial	UNK	n/a	inactive unusable
HAMMER_PNNL12	Artificial	UNK	n/a	inactive, unusable
HAMMER_PNNL2	Artificial	UNK	n/a	active
HAMMER_PNNL3A	Artificial	UNK	n/a	active
HAMMER_PNNL3B	Artificial	UNK	n/a	active
HAMMER_PNNL4A	Artificial	UNK	n/a	active
HAMMER_PNNL4B	Artificial	UNK	n/a	active
HAMMER_PNNL5	Artificial	UNK	n/a	active
HAMMER_PNNL6	Artificial	UNK	n/a	active, maintenance
HAMMER_PNNL7	Artificial	UNK	n/a	active
HAMMER_PNNL8A	Artificial	UNK	n/a	inactive, unusable
HAMMER_PNNL8B	Artificial	UNK	n/a	inactive, maintenance
HAMMER_PNNL8C	Artificial	UNK	n/a	inactive, maintenance

Site Name	Burrow Construction	Use Type	STATUS 2010	STATUS 2012
HAMMER_PNNL9	Artificial	UNK	n/a	inactive, maintenance
HAMMER_PNNL9B	Artificial	UNK	n/a	active
HAMMER_PNNL9C	Artificial	UNK	n/a	active, maintenance
HolocekHS1	BADGER	NEST	n/a	active
HolocekHS2	BADGER	UNK	n/a	inactive, potential
IDF_PNNL1	Artificial	UNK	n/a	inactive
IDF_PNNL10	Artificial	UNK	n/a	inactive
IDF_PNNL11	Artificial	UNK	n/a	inactive, unusable
IDF_PNNL12	Artificial	UNK	n/a	inactive, unusable
IDF_PNNL13	Artificial	UNK	n/a	inactive, unusable
IDF_PNNL14	Artificial	UNK	n/a	inactive, unusable
IDF_PNNL15	Artificial	UNK	n/a	inactive
IDF_PNNL16	Artificial	UNK	n/a	inactive
IDF_PNNL17	Artificial	UNK	n/a	inactive
IDF_PNNL18	Artificial	UNK	n/a	inactive, unusable
IDF_PNNL19	Artificial	UNK	n/a	inactive, unusable
IDF_PNNL2	Artificial	UNK	n/a	inactive
IDF_PNNL20	Artificial	UNK	n/a	inactive
IDF_PNNL21	Artificial	UNK	n/a	inactive, unusable
IDF_PNNL22	Artificial	UNK	n/a	inactive, unusable
IDF_PNNL3	Artificial	UNK	n/a	inactive unusable
IDF_PNNL4	Artificial	UNK	n/a	inactive unusable
IDF_PNNL5	Artificial	UNK	n/a	inactive unusable
IDF_PNNL6	Artificial	UNK	n/a	inactive unusable
IDF_PNNL7	Artificial	UNK	n/a	inactive unusable
IDF_PNNL8	Artificial	UNK	n/a	inactive unusable
IDF_PNNL9	Artificial	UNK	n/a	inactive unusable
MAYJ-1	BADGER	NEST	inactive	inactive, unusable
OLDF-1	BADGER	NEST	inactive	inactive, potential
OLDF-2	MAN-MADE	NEST	active	inactive
OLDF-2A	MAN-MADE	SATELLITE	active	Active
OLDF-2B	MAN-MADE	SATELLITE	n/a	active
OLDF-3	MAN-MADE	NEST	active	Active
OLDF-3A	MAN-MADE	NEST	n/a	active
OLDF-4	MAN-MADE	NEST	active	Active
ORCH-1	MAN-MADE	NEST	n/a	active
ORCH-1A	MAN-MADE	NEST	unk	active
ORCH-3	MAN-MADE	NEST	inactive	Inactive, potential
ORCH-3A	MAN-MADE	SATELLITE	inactive	Inactive, potential
ORCH-5	MAN-MADE	NEST	inactive	Inactive, potential
ORCH-5A	MAN-MADE	SATELLITE	inactive	Inactive, potential

Site Name	Burrow Construction	Use Type	STATUS 2010	STATUS 2012
Pit 12 A	MAMMAL	UNK	n/a	inactive
Pit 12 B	MAMMAL	UNK	n/a	inactive
Pit 12 C	MAMMAL	UNK	n/a	inactive
Pit 12 D	MAMMAL	UNK	n/a	inactive
RT1-1	BADGER	NEST	inactive	inactive, potential
RT11-1	BADGER	NEST	inactive	inactive, potential
RT11-1A	BADGER	SATELLITE	inactive	inactive, potential
RT11-1B	BADGER	SATELLITE	inactive	inactive, potential
RT11-2	BADGER	NEST	inactive	inactive, potential
RT1A-1A	BADGER	UNK	inactive	inactive, unusable
RT2S-1	BADGER	NEST	inactive	inactive, unusable
SR240-1	BADGER	UNK	unk	inactive, potential
TOWN-1	MAN-MADE	NEST	inactive	colony of bees
YakBarr1	BADGER	UNK	n/a	inactive, potential